

Buried Soil Horizons, Mantles, and Buried Soils

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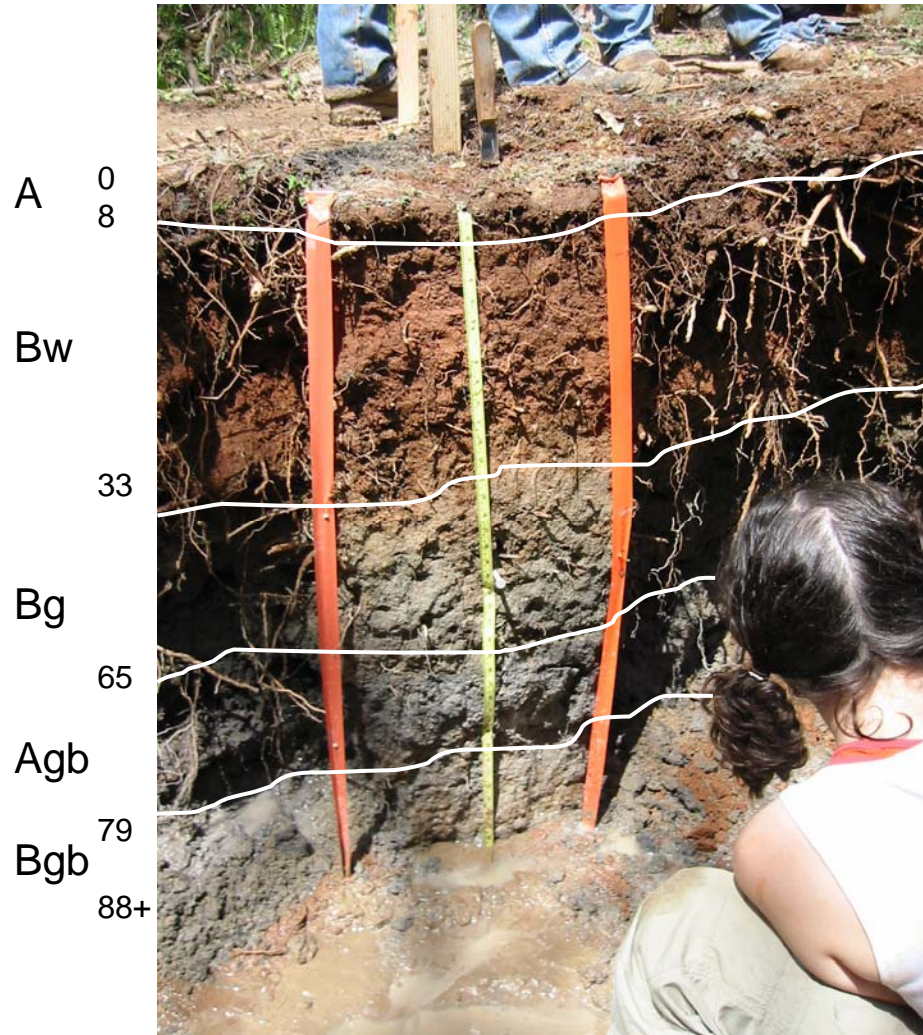
3/2006

What is a Buried Soil Horizon?

Feb. 24, 2006 noon

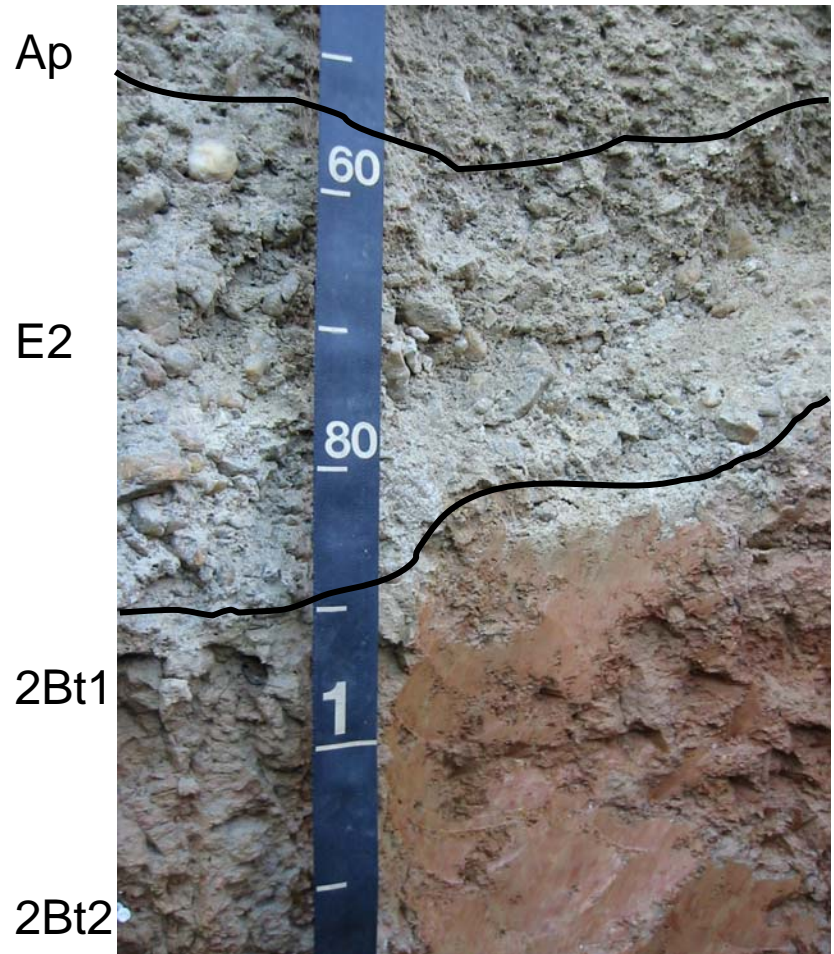
- A **buried soil horizon** is a soil horizon that formed in place and then was covered by recently transported material.
- “b” is not added to the horizon name if significant soil development has taken place across the contact between the transported material and the buried soil horizons, especially if the A horizon has been truncated or if there is no irregular decrease in Holocene age-carbon.
- C horizons are NOT eligible to have a “b” in the name, because they are parent materials.
- There is no minimum thickness of recently transported material before you use a “b”.
- The transportation source of the recently transported material might be animals (esp. humans), wind, water, ice, or gravity.

Recently buried soil



Ancient buried soil

- If the soil is on an upland and there is a change in parent materials or agent of transportation that caused a burial of former soils or parent materials, but there are no buried A horizons left, and we think that soil formation has taken place across both materials since the burial, we do not use “b” in the horizon names. In this example, we see a lithologic discontinuity at 89 cm.
- This soil has gravelly, sandy river alluvium over residuum. The albic and the argillic appear to have formed after the deposition of the alluvium.
- Instead of using a “b” on these, we can use “2” or “3”. That means we observe ancient burial from a distinctly different parent material.



What is a Mantle?

- There are soils that have recently transported material on top of buried soil horizons, but those materials do not always qualify as a mantle.
- A **surface mantle of new material (SMNM)** is a recent deposit of recently transported material that meets the following requirements:
 - The bottom 7.5 cm or more of the **recent deposit** does not meet the requirements of any diagnostic horizon. Usually the bottom is a C horizon, but it may be an A or B horizon. For example, it could be a Bw horizon that is too sandy to be part of a cambic.
 - **The recent deposit** can have any epipedon, but need not have any if too recently deposited.
 - **The recent deposit** can have a cambic horizon but no other diagnostic subsurface horizons, but need not have any if too sandy or too recently deposited.
- The **SMNM** is either a fairly recent deposit or is very sandy or occurs in an area with a very slow rate of soil development.

What do I classify?

- 1) If there is no SMNM, or no buried soil because the SMNM is too thin, the soil is classified from the surface.
- 2) If there is a SMNM ≥ 50 cm thick, or the SMNM is ≥ 30 thick, and the SMNM thickness is $\geq 1/3$ the bottom depth of the deepest diagnostic horizon beneath the SMNM, classify from the surface.
- 3) If there is a SMNM, but it is thinner than required in #2 above, an epipedon is identified at the surface and any additional diagnostic horizons are identified only in horizons that have a “b” subscript letter.

What is a buried soil?

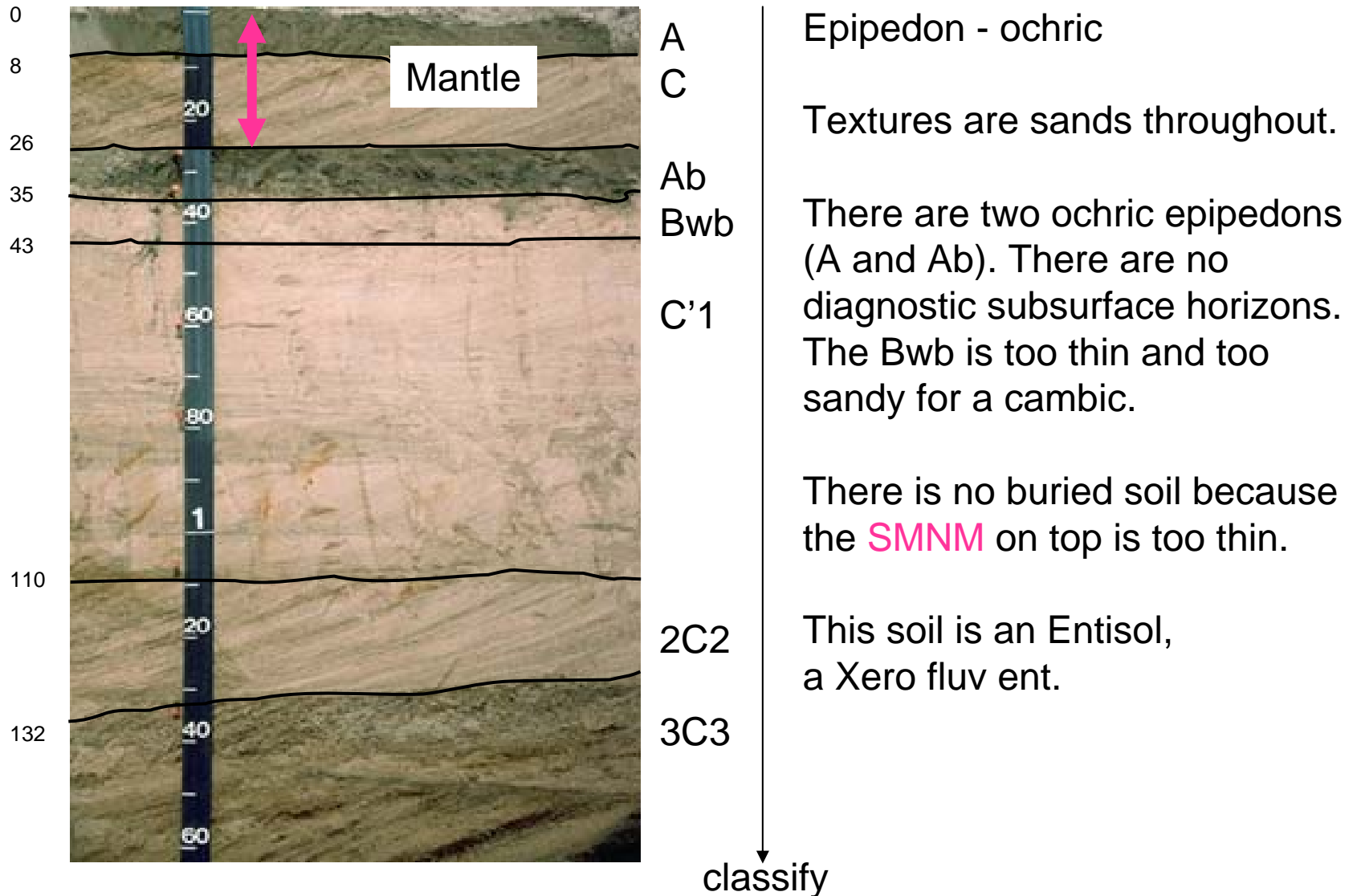
A **buried soil** is a soil with diagnostic horizons that formed before the mantle arrived. Further, the **SMNM** must meet the following criteria before the sequence of buried horizons underneath are declared a **buried soil**:

a) the **SMNM** is ≥ 50 cm thick, or

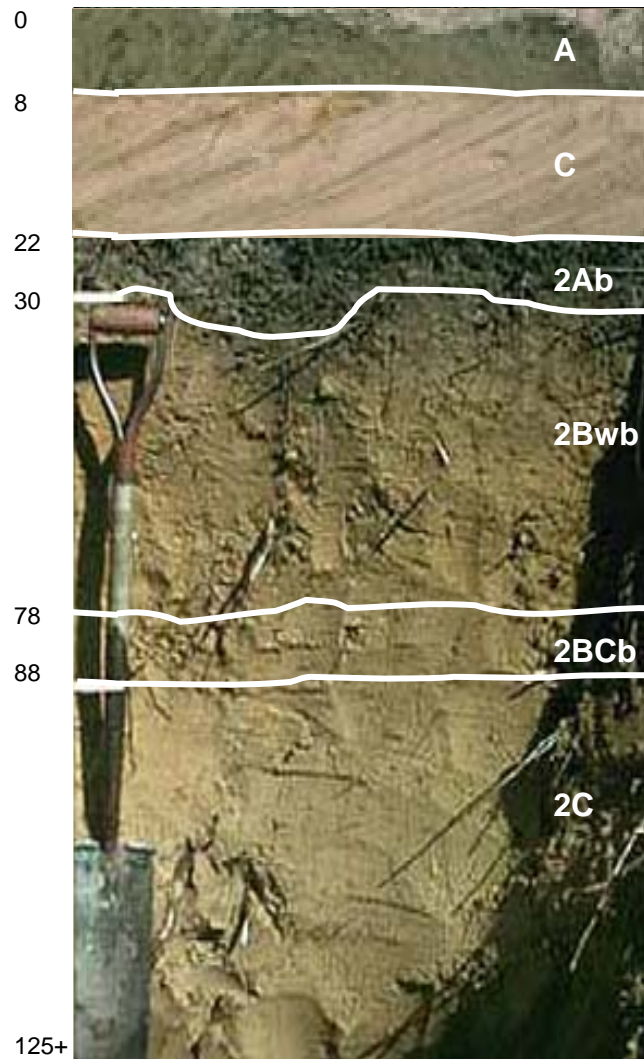
b) the **SMNM** is ≥ 30 thick, and

the **SMNM** thickness is $\geq 1/3$ the bottom depth of the deepest diagnostic horizon beneath the mantle.

A soil with no buried soil and a SMNM(1)



A soil with no buried soil and a **SMNM**(2)



Epipedon – ochric.

All textures above 25 cm are sands, all below 25 cm are loams or silt loams.

There are two ochric epipedons (A and 2Ab).

There is a cambic diagnostic subsurface horizon (2Bwb and 2BCb).

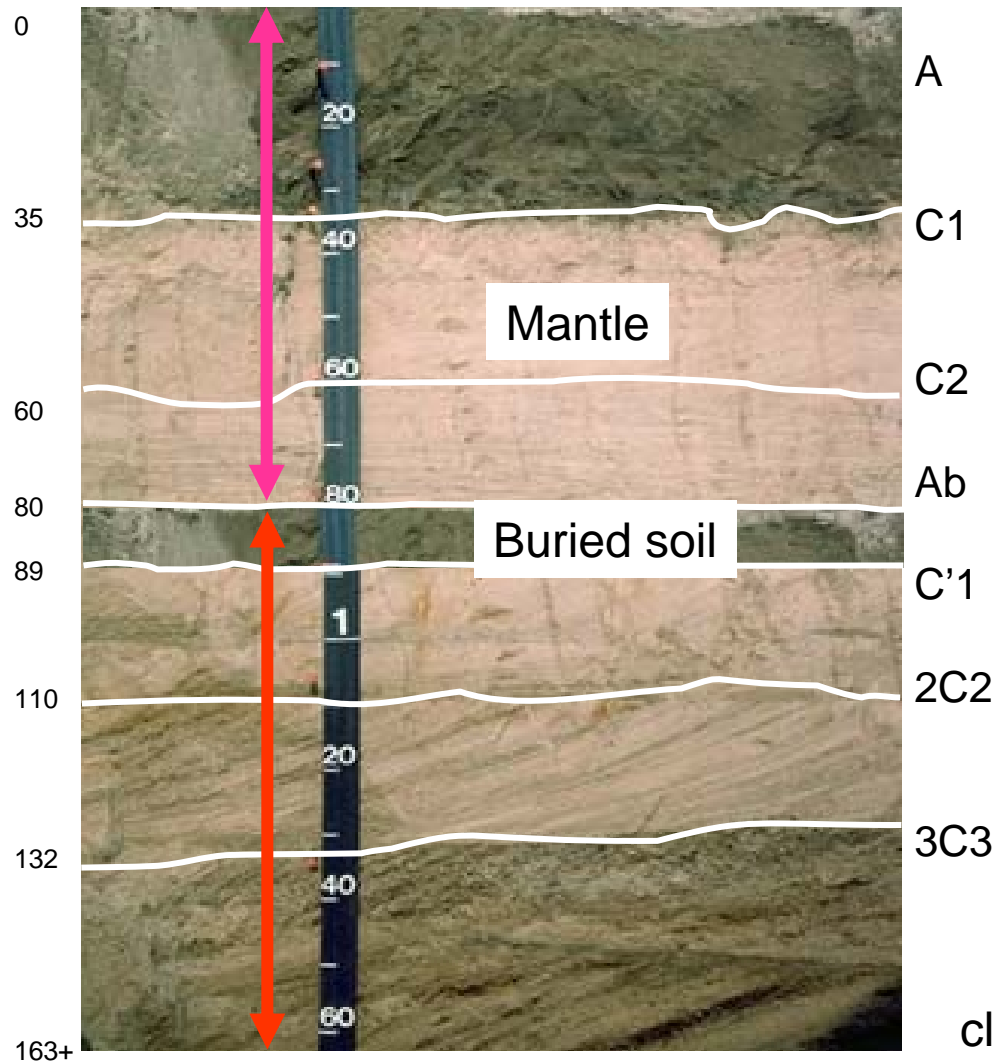
There is a mantle because the lower part of the recent deposit is not part of a diagnostic subsurface horizon. However, it is too thin to qualify the diagnostic horizons underneath as a buried soil. It would have needed to be 1/3 of 88 (~29 cm) thick, but also would have needed to be the minimum 30 cm thick.

There is no buried soil because the **SMNM** is too thin.

The buried cambic would be used to classify this soil as an Inceptisol, a Haplo xer ept.

classify

A soil with a buried soil and a SMNM



Epipedon - ochric

The A horizon is 10YR 4/3 moist and has no CaCO_3 .

There are two ochric epipedons (A and Ab). There are no diagnostic subsurface horizons.

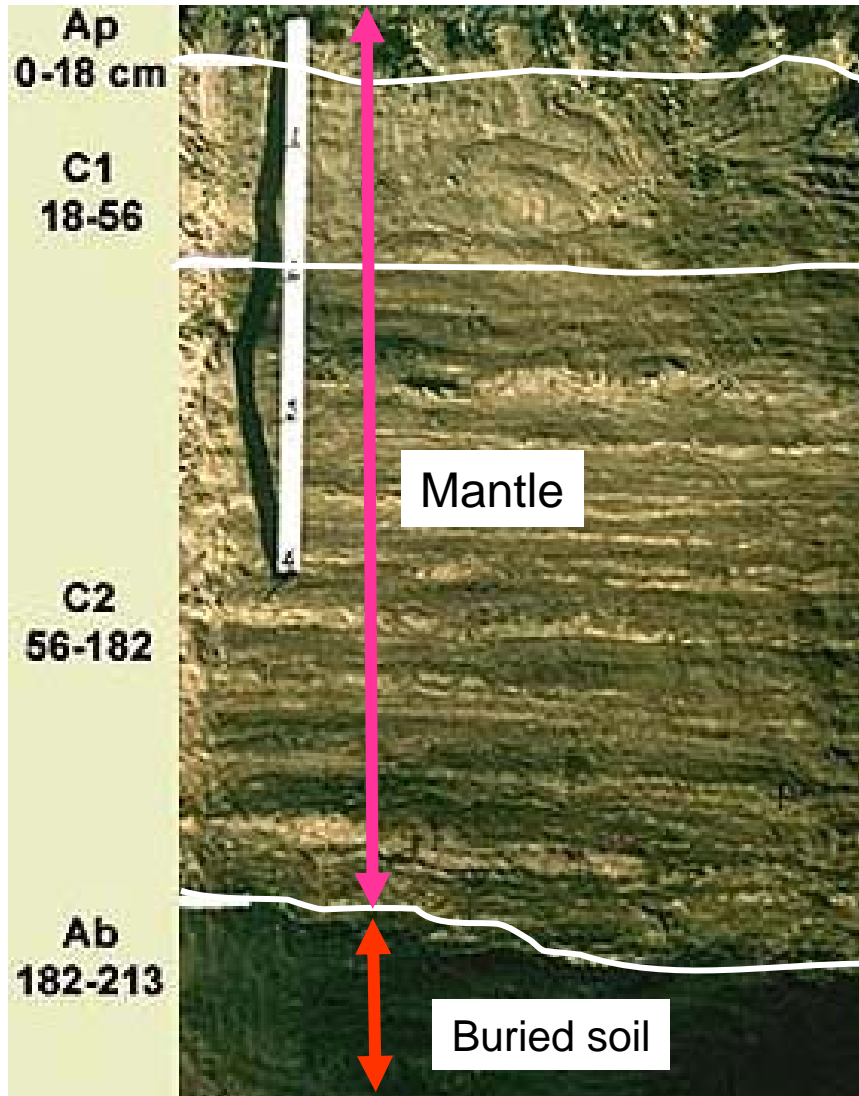
The SMNM on top is thick enough to qualify the buried horizons as a buried soil (more than 50 cm thick).

There is a buried soil starting at 80 cm. The only diagnostic horizon is the buried ochric epipedon (A'b).

This soil is an Entisol, a Xero fluv ent.

classify

A soil with a buried soil and a SMNM



classify

Epipedon – none. What would have been an ochric is an (Ap) that directly overlies freshly stratified sediments and an irregular decrease in carbon.

Textures are loams and silt loams.

There is no epipedon at the surface, but a buried mollic (Ab).

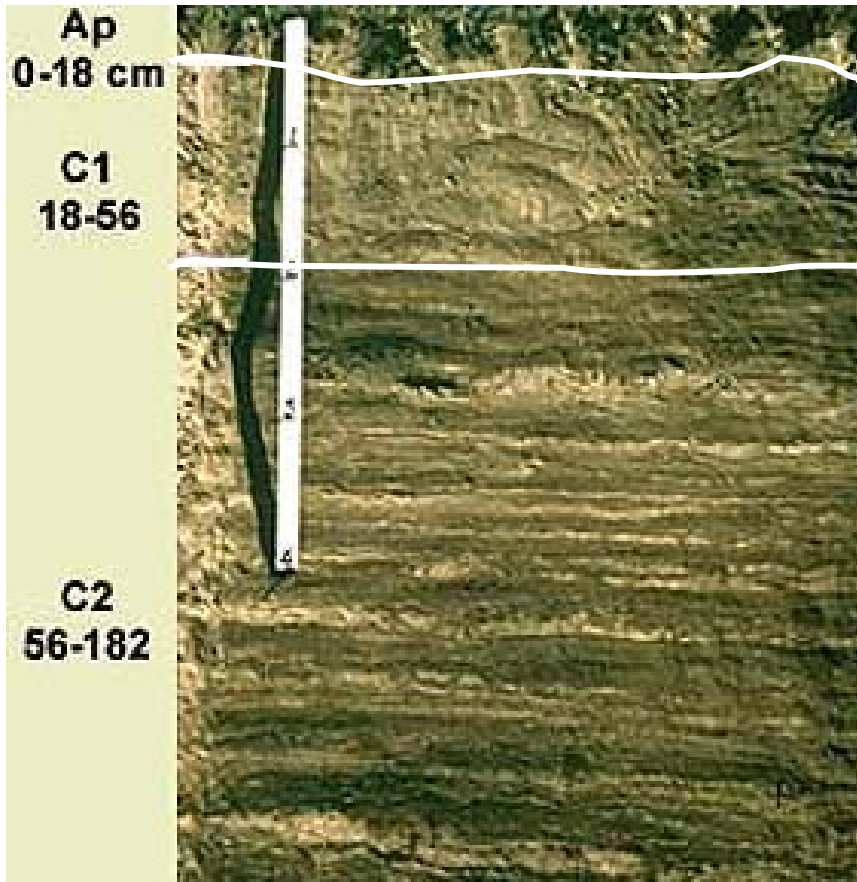
There are no diagnostic subsurface horizons.

There is a buried soil beginning at 182 cm.

Since the SMNM is > 50 cm thick, the buried soil horizons are qualified to be a buried soil. We classify the soil from the surface. The epipedon is none. The mollic epipedon is not used except to confirm an irregular decrease in carbon.

This soil is an Entisol, a Xero fluv ent.

A soil with no buried soil and no SMNM



Epipedon – none. What would have been an ochric is an (Ap) that directly overlies freshly stratified sediments and an irregular decrease in carbon.

Textures are sands stratified with loams.

There is no diagnostic epipedon or subsurface horizons. There is no SMNM since the whole soil is a recent deposit.

This soil is an Entisol, a Xero fluv ent.

↓
classify

A soil with no buried soil and no mantle

Epipedon – mollic.

All textures to 80 cm are loams or silt loams, then VCoS beneath. Base sat. is > 50% throughout the soil.

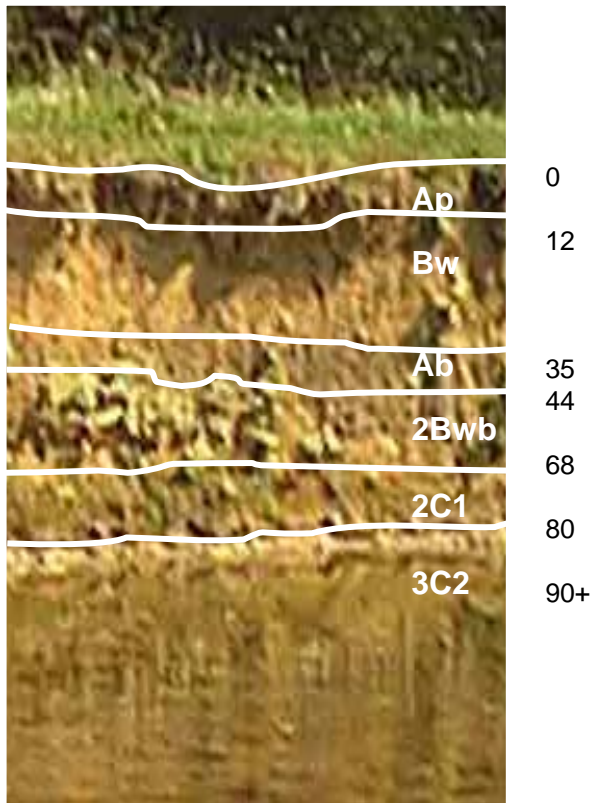
There is a mollic epipedon (A) and a buried ochric epipedon.

There are two diagnostic subsurface horizons, a cambic (Bw) and a second cambic (2Bwb).

The recent deposit is thick, but there is no **SMNM** because the lower part of the recent deposit is part of a diagnostic subsurface horizon.

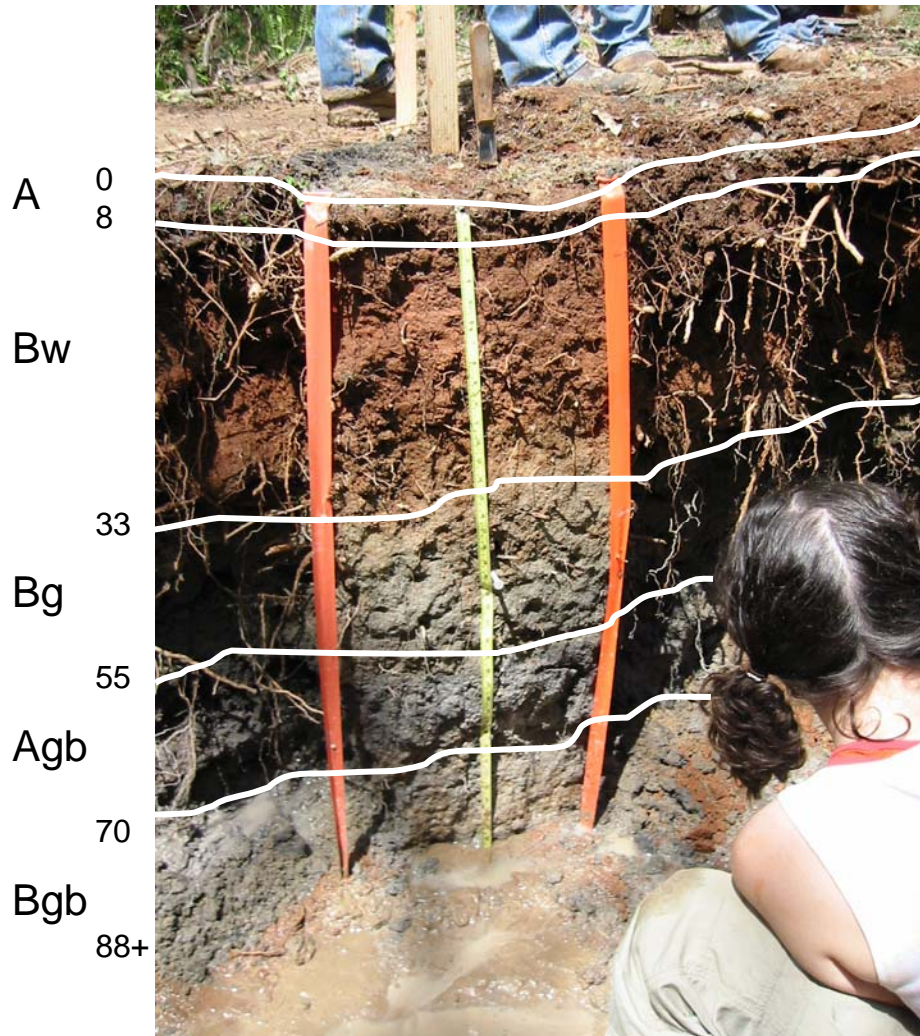
We classify the soil from the surface.
The buried diagnostic horizons are not used except to confirm an irregular decrease in carbon.

This soil is a Mollisol, a Haplo xer oll.



↓
classify

A soil with no mantle and no buried soil



Epipedon – ochric.

All textures to 80 cm are loams or silt loams. Base sat. is < 50% throughout.

There is an ochric epipedon (A) and a buried umbric epipedon (Agb).

There are two diagnostic subsurface horizons. A cambic (Bw and Bg). The Bw is a dry cambic, the Bg is a wet cambic, but each qualifies and are touching so we add them together. There is a second wet cambic (Bgb).

The recent deposit is thick, but there is no **SMNM** because the lower part of the recent deposit is part of a diagnostic subsurface horizon. Thus we cannot have a buried soil underneath.

We classify the soil from the surface. The buried diagnostic horizons are not used except to confirm an irregular decrease in carbon.

↓
classify This soil is an Inceptisol,
an Endo aqu ept.